variable intervals, the experiment could be interpreted as showing that the short intervals were important in maintaining some superstitious response.] The specific role that adventitious reinforcement plays in establishing and maintaining behavior under delayed reinforcement has not been precisely determined, although the fact that it does play a role is clear. Whether a variable delay interval is no more disruptive than a constant one which is gradually increased needs further examination.

A second implication of this study might be formulated in the following way. Given some minimal maintenance of responding in the several members of a chained schedule, the terminal level of responding depends on the parameters of the schedule itself, not on how S reached that particular schedule. This independence from previous training permits the use of chained schedules as tools for evaluating the reinforcing effectiveness of many different behavioral variables.

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NOTES

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Effects of elymoclavine on wheel turning activity in mice

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Five groups of mice received 0, 10, 30, 90, or 270 µg/kg body weight of elymoclavine, a drug chemically similar to LSD. Over 5 consecutive days, smaller dosage levels either enhanced or produced little change in wheel-running activity, while higher dosages produced a decrement.

LSD is a well known hallucinogenic compound derived from ergot alkaloids. Elymoclavine, a member of a new series of ergot alkaloids, has a chemical structure almost identical to that of LSD (Ray & Wong, 1967). Available data indicate that these two derivatives also have similar behavioral effects. Rothlin (1957) reported that both produce mydriasis, Straub tail effect, spastic paresis, ataxia, excessive urination, pilo erection, and

hyperirritability. Yui & Takao (1958a, b) found that both produce similar analeptic reactions and EEG effects. Hamilton (1960) and Ray & Wong (1967) found that the compounds facilitated avoidance learning in rats. Recent studies by Essman (1967) and Slivka, Landis, & Mountjoy (1967) indicate that larger doses of LSD have a debilitating effect on general activity. The present experiment was designed to explore the relationship between elymoclavine dosage level and general activity.

SUBJECTS AND APPARATUS

Twenty-five male Swiss Webster mice, weighing approximately 30 g each, were maintained on ad lib food and water throughout the experiment. The apparatus consisted of seven Wahman activity wheels that recorded each full wheel turn in either direction.

PROCEDURE

The Ss were divided randomly into five groups of five Ss each. To determine basal activity levels, each S was placed in the

apparatus for 30 min each day for 5 consecutive days. Each group was then assigned randomly a dosage level of 0, 10, 30, 90, or 270 µg/kg body weight. Elymoclavine was dissolved in a 1.0% tartaric acid solution and injected intraperitoneally. The 0 group received an injection of the base solution. On each of 5 consecutive days, each S was placed in a cage adjacent to the activity wheel for a 10-min postinjection period. This was followed by 30 min in the wheel.

RESULTS

The dependent variable was the number of full wheel turns recorded for each 30-min session. Figure 1 illustrates the mean number of wheel turns for each group for all baseline and experimental days. The figure shows that the general trend toward increased activity over baseline days was disrupted on the first drug day, Groups 0, 90, and 270 showing a decrease in activity, while Groups 10 and 30 increased. While changes in activity levels for Groups 10 and 90 approached significance [$t(4) = 2.58$ and 2.43 , respectively, $p < .10$ for both], only Group 270 changed significantly [$t(4) = 9.24$, $p < .001$].

Analysis of variance of the baseline data revealed that the overall increment in activity over days was significant [$F(4,80) = 10.74$, $p < .001$] and that the groups and groups by days effects were not significant. Analysis of the drug data indicated a significant dosage effect [$F(4,20) = 6.19$, $p < .001$] and that the overall days effect was significant [$F(4,80) = 3.06$, $p < .05$]. The Dosage by Days interaction was not significant. Duncan's Multiple Range Test indicated that Groups 10 and 30 were not significantly different, but both differed from Group 90 ($p < .05$) and from Groups 0 and 270 ($p < .001$). Group 90 differed from Group 270 ($p < .01$) but not from Group 0. Group 0 differed from Group 270 ($p < .05$).

DISCUSSION

These results show clearly the nonmonotonic effect of increasing dosage levels of elymoclavine on activity. Smaller doses produced an increment in performance, with greatest facilitation at the 30 µg/kg level, while larger doses produced a relative decrement in activity. The possibility that cumulative toxic effects of the drug were, at least in part, responsible for the performance of Group 270 is evidenced by the fact that three of the five mice in this group died within 2 days after completion of the study. No deaths occurred in the other groups.

At any rate, the results of this study

Fig. 1. Mean number of wheel turns for each group during baseline and drug days (N = 5 for each group).

certainly suggest that contemplated investigations of drug-motivated behavior should be preceded by careful examination of drug dosage level, and that incongruous findings (e.g., Jarrard, 1963; Gardner, 1965) may be due, in part, to incomparable ranges of drug dosage.

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NOTE

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